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quite freely. Before sunset the Holboell call drew my eye to a reunited family, the mother with all three young. Between dives there once seemed to be a second adult, as if the father had joined the family again. The suggestion was so pleasant that I found myself making excuses for his absence. Perhaps to make the group less conspicuous he kept away in the day time, but before night, came to help guard the little ones during the hours of darkness.

A sudden splash! Probably the Black-crowned Night Heron on the post just beyond had caught a minnow. As I glanced around the curving tule border of the harbor, warm in the glowing light, another Heron's form was dimly outlined—a hunter in his blind. In the smooth mirror of the lake, the cumulus cloud above the harvest field was growing salmon. The sound of a binder came on the wind. Swallows twittered, flying swiftly overhead, and small squads of Ducks swung in. Two Pintails lit outside the circle of waterfowl and sitting high, with long necks raised, looked nervously on, not having learned the security of the quiet refuge; but from within the circle, the homelike quack of Mallards came from a band swimming around self-absorbed and unafraid. Flocks of Ducks, Gulls, and Crows, crossing overhead to their nightly roosts made no ripple in the life of the little harbor, in which was heard the soft *tu-weep* of the Spotted Sandpiper, well suited to the stillness of the peaceful, sunny bay.

As I carefully withdrew leaving the birds undisturbed in their safe haven for the night, I passed up the road by the lake now bordered with golden wild flowers. Looking west I could see not only the connecting Coulee, but the white line of the large Sweetwater beyond the Bridge. From the east a flock of Black Terns came speeding in. From the sunset a golden portico was reflected in the lake, its illumination spreading to a wide golden band reaching across the water. Into the east came a soft pink afterglow, and well up in the sky rode the harvest moon, while the weary harvesters, their day over at last, were wending their way slowly home.

(To be continued)

NOTES ON THE ELEGANT TERN AS A BIRD OF CALIFORNIA

By JOSEPH GRINNELL

(Contribution from the Museum of Vertebrate Zoology of the University of California)

THE Elegant Tern (*Sterna elegans*) is one of the several species of sea birds which nest altogether to the south of the United States and yet which appear at certain times of the year well north of our southern borders. It is listed as a bird of California upon rather meager basis, and some of the general statements made during recent years in regard to the manner of its occurrence, by the present writer among several, are likely to have left the hearer or reader with incorrect impressions. The purpose of the present article is to assemble all that has been published to date with regard to the Elegant Tern as occurring in California, to scrutinize this information closely, and to put on record an increment which has resulted from field work of the California Museum of Vertebrate Zoology.

Sterna elegans was originally described by William Gambel (Proc. Acad. Nat. Sci. Phila., 1848, p. 129), who himself "procured this species on the Pacific coast of Mexico, particularly at Mazatlan at the mouth of the Gulf of California". Some subsequent authors who credited the species to "California" or the "coast of California", may have merely inferred this, or may have carelessly transcribed the term California, alone, from Gambel's statement as just quoted. In the case of Coues (Proc. Acad. Nat. Sci. Phila., 1862, p. 540), who credits the Elegant Tern to the "Coast of California", without remark, it is of course possible that specimens taken in California were at hand. But if so, no other, or more exact, reference has been made to them in print. Not until 1868 was specific evidence given, of specimens having been actually secured within the state of California as now defined.

The first well-founded ascription of the Elegant Tern to California, then, insofar as known to me, was that by Cooper (Proc. Calif. Acad. Sci., iv, 1868, p. 10). The statement made by this author is as follows: "The first specimens I have seen from this State were shot by Mr. Lorquin in S. F. Bay, and are in fine plumage." It is to be inferred that two or more examples were encountered, but no dates or further facts are given. The whereabouts of Lorquin's birds, if they still exist, are unknown to me.

Belding apparently never himself met with this species, but he states (MS, "Water Birds", 1897): "Mr. J. C. Parker has a specimen, shot at San Diego, he informed me, in summer." The phrase "in summer" is so vague that it cannot safely be used in any seasonal study of the species.

As a result of his own observations upon the water birds of Monterey Bay in the fall of 1896, Mr. Leverett Mills Loomis makes record (Proc. Calif. Acad. Sci., 3rd ser., Zool., II, 1900, pp. 279, 287, 293, 319) of Elegant Terns as follows: September 22, a pair was noted "flying along the bay shore toward Point Pinos". October 9, offshore north of Monterey "a band of eight" was decoyed into close range, "and in another place, one of seven." October 29, three were met with, resting on a patch of drifting kelp. "No examples were noticed in November." This species "was more sparingly represented than its congener *maxima*." It is known that Mr. Loomis took a number of specimens, but these were all destroyed in the San Francisco fire of 1906.

Dr. Louis B. Bishop records (Condor, VII, September, 1905, p. 141) the capture of "an adult male" Elegant Tern at Pacific Beach, near San Diego, September 21, 1904.

In 1910, Mr. Rollo H. Beck wrote (Proc. Calif. Acad. Sci., 4th ser., III, September 17, 1910, p. 64) that in his extensive collecting for the California Academy of Sciences on Monterey Bay at various times between September 8, 1903, and January 22, 1910, he had never himself met with the Elegant Tern.

On August 2, 1910, Mr. Beck began regular work with the water birds on Monterey Bay for the California Museum of Vertebrate Zoology, and continued thus until March 1, 1911. During this period he encountered the Elegant Tern once, on October 27, 1910, when one example, a male (now no. 18382, Mus. Vert. Zool.), was obtained. His field notes of that date indicate that four of the birds were seen by him late in the afternoon off China Point (Pacific Grove), going south. The one shot had a fish in its stomach. The same four birds, presumably, had been seen earlier in the day (about 2 p. m.) off Seaside.

In the fall of 1918 collecting was done at Morro, San Luis Obispo County,

by representatives from the California Museum of Vertebrate Zoology, from September 18 until November 7. Messrs. Halsted G. White, Joseph Dixon and J. Grinnell constituted the party, and one or more of these collectors worked in the immediate vicinity of Morro during the entire time. For a portion of this period the Elegant Tern proved to be a fairly common water bird on Morro Bay, or else on the outside ocean beach. The first one was positively identified on September 22, the last on October 4. Field notes follow.

September 22: One shot from company with six Royal Terns flying over the breakers of sea-beach, about two miles north of Morro (H. G. W.). On Morro Bay close to Morro, many terns seen, but not closely, of three sizes, the middle-sized one believed to be the Elegant (J. G.).

September 23: Around sandbar in Morro Bay, one Elegant Tern seen in a bunch of about twenty Royal Terns. The bill of the latter looked to be darker orange at base. Elegant appeared midway in size between Forster and Royal. No "rosy flush" could be seen in the plumage of the Elegant, even within forty yards, in strong sunlight, and with the aid of binoculars (J. D.).

September 27: One shot from company of about thirteen Royal Terns flying along sea-beach north of Morro. The bird was recognized by its smaller size, and at a distance of about twenty yards the pink coloring beneath was noticed. In flight it looked like a Royal Tern but seemed "more airy", or more graceful. It more often "cut figures in the sky", in other words it was slightly less heavy on the wing, this perhaps due merely to its smaller size (H. G. W.).

September 28: Along the sea-beach two miles north of Morro, thirty-two terns were encountered. Four of these were Forster, about twenty were Royal, and about eight were Elegant. The collector used a dead Willet as a decoy, and by throwing this into the air and letting it splash in the water, three of the Elegant Terns were brought into shot-gun range and secured. In this case it seemed that of the three species of tern, the Elegant showed the most curiosity (H. G. W.). Also one seen flying "just out of range, over the spit" opposite Morro (J. D.).

September 29: Two seen along sea-beach within two miles north of Morro (H. G. W.). Flock of about twenty-five seen on the Bay close to Morro. One shot. Pink bloom "not visible even when the birds were within easy shot-gun range" (J. D.).

October 1: Elegant Terns, in company with Arctic, kept flying about sandbar in Morro Bay during visit there (J. D.).

October 2: One Elegant secured at sandbar in Bay out of a mixed company of Royal, Elegant and Arctic, about one hundred in all (J. D.).

October 4: On sandbar in Morro Bay: terns wild; of these the Royal, Elegant and Arctic took flight in about the order named (J. D.).

As regards marks for field identification, there seems to be no outstanding positive feature by which the Elegant Tern may be distinguished at any ordinary distance from its congeners, unless conditions be such that relative size is determinable. From the notes of the field collectors just quoted, it is to be inferred that the pink blush of the lower surface can be seen clearly only under very exceptional circumstances. The relative slenderness of the bill of the Elegant *might* be used, if the proportions of this member in the Royal be vividly in mind or if birds of the two species be seen contemporaneously within short range.

Relative size is quite positively diagnostic of the Elegant, if other sea-coast frequenting species of terns be in sight at the same time. Roughly, *elegans* is a large tern, yet decidedly smaller than its usual associate, the Royal. Some exact figures will here be instructive. Weight is, of course, a much more accurate index of the volume or "bulk" of a bird, generally speaking, than is any measurement such as total length or length of closed wing. The seven

specimens of Elegant Tern listed in the accompanying table show an average weight of 232 grams. Five specimens of Royal Tern shot at about the same time and place gave an average weight of 489 grams. One example of the Common Tern weighed 113 grams. The other terns in the vicinity at the time the Elegant Terns were met with at Morro Bay were the Arctic and Forster, but unfortunately weights of these were not secured. The last two, however, show about the dimensions of the Common and may be inferred to weigh about the same. As to relative size, then, the Elegant Tern is about half the bulk of the Royal, and yet about twice that of the Common, Arctic or Forster. In other words, the Elegant is fairly midway in size between the Royal and the tern next smaller than itself—obviously a good criterion for recognition when any of the species in question are about.

As to behavior, *elegans* is a typical tern. One observer quoted above thinks that it is more "airy" or graceful in flight than its heavier associate *maxima*. But I confess my own inability to note any decided difference in this respect. Relative size remains the best mark for field identification.

Color notes on *Sterna elegans* were taken by Mr. H. G. White from fresh specimens by direct comparison with the plates in a copy of Ridgway's *Color Standards and Color Nomenclature*, with results as follows:

No. 29579: Bill chiefly coral red, becoming straw yellow towards tip, yellowest at extreme tip. Feet and legs sepia, save for spots of orange on hinder side of tarsus, and same color on soles of all toes. Iris hazel.

No. 29580: Bill ochraceous-orange at base, becoming yellow ocher at tip. Feet and legs black; soles of toes spotted with yellow ocher. Iris hazel.

No. 29581: Bill bittersweet orange at base, antimony yellow at tip. Feet and legs black; tarsus behind, toes, and webs, blotched with bittersweet orange. Iris hazel.

No. 29582: Bill grenadine at base, becoming antimony yellow at tip. Feet and legs black, tarsus solidly so; soles of toes blotched with dull orange. Iris hazel.

No. 29583: Bill salmon color, becoming antimony yellow at tip. Feet and legs black, blotched all the way up, from soles of toes to tibia, with salmon color. Iris hazel.

With drying, the above colors have changed intrinsically but little. Now, after one year has elapsed, there is a general dingy tone, and in the case of no. 29583, which had the bill palest of the five, the red tone, weak at best, has faded out so that the whole bill is dingy yellow ocher. Nos. 29577 and 29578, which were not color-matched when fresh, are also of this yellow-billed type, decidedly different from the reddish orange tone of bill in the other four specimens. With this variation in color of bill in evidence it becomes impossible to use this feature as a field mark.

As regards color of legs and feet, none of our birds has these members solidly black, but they are more or less spotted or blotched with approximately the color of the bill. Ridgway (Birds N. and Mid. Amer., viii, 1919, p. 472) says, "legs and feet black". Coues (Key, 5th ed., 1903, p. 1007) says: "Feet black; soles and under surfaces of claws slightly yellowish". This latter statement more nearly agrees with the condition of our birds.

As to plumage, the Morro series agrees with Ridgway's description (loc. cit.) of what he terms the "post-nuptial (?) plumage". Note the question-mark. Neither am I able to decide definitely as to age. All seven of our birds are in the same stage, whatever it may be, and all seem to have completed a molt recently. The tail tips are but little, or not at all, worn. In all of the skins there is the eosine pink blush on the underparts, this involving not only

the body proper but also the crissum, the basal half of the rectrices, the axillars, and the lining of the wing. There seems to be no sexual difference in respect to the depth of this blush. Slightly the pinkest happens to be a female (no. 29579). Coues, curiously, states (loc. cit.) that "in winter" there is "no pink blush of under parts". Ridgway, by implication, says that there is; and our birds are all more or less pink.

WEIGHTS (IN GRAMS) AND MEASUREMENTS (IN MILLIMETERS) OF SEVEN EXAMPLES OF *STERNA ELEGANS* FROM MORRO, CALIFORNIA

No. Mus. Vert. Zool.	Sex	Date	Collector	Weight (grams)	Wing	Tail	Culmen	Bill from nostril	Gonys	Depth of bill at middle of nostril	Tarsus	Middle toe and claw
29579	♀	Sept. 22, 1918	H. G. White	226.1	297	151	59.2	44.9	35.2	11.0	29.0	30.0
29580	♂	Sept. 27, 1918	H. G. White	227.2	306	159	64.9	51.1	38.5	11.3	30.7	29.8
29581	♂	Sept. 28, 1918	H. G. White	240.0	298	129	57.7	43.3	31.0	10.8	28.6	31.7
29582	♀	Sept. 28, 1918	H. G. White	209.9	289	132	55.2	41.7	31.4	9.4	27.6	28.5
29583	♂	Sept. 28, 1918	H. G. White	240.0	291	139	61.3	44.3	32.5	10.5	29.7	29.7
29577	♂	Sept. 29, 1918	J. Dixon	262.8	317	158	68.7	53.7	37.7	30.3	31.6
29578	♂	Oct. 2, 1918	J. Dixon	216.8	292	133	60.3	45.0	33.0	11.0	29.7	30.2
Average				231.8	298.6	143.0	61.0	46.3	34.2	10.7	29.4	30.2

In measurements, as shown in the table given herewith, the Morro series holds closely to Ridgway's specifications (loc. cit., p. 473). It will be noted that the angle of the lower mandible, marking posterior end of gonys, is far forward of the anterior end of nostril, so ruling out the possibility that our birds, or at least those with yellowish bills, might be representative of the species *Sterna eurygnatha* of eastern South America. This possibility suggested itself because this latter species is described (Saunders, Cat. Birds British Mus., xxv, 1896, p. 85) as having a "lemon-yellow" bill, and the "hind parts of the tarsi, the soles, and and the claws dull yellow." *Eurygnatha* is stated to be identical with *elegans* except as to the color features just referred to and as to the extent of the gonys, which terminates posteriorly "immediately below or very little in front of the anterior portion of the nostril". On the basis of sum-total of characters, *Sterna elegans* is a sharply set-off species, and no difficulty need be experienced in identifying specimens in hand. Measurements alone, as given in the accompanying table, will suffice.

In conclusion, the status of *Sterna elegans* in California, so far as known to date, may be stated as follows: Rather uncommon and probably irregular fall visitant northward along the sea coast as far as San Francisco Bay. Definite stations and dates of occurrence: Pacific Beach (near San Diego), September 21; vicinity of Morro, September 22 to October 4; Monterey Bay, September 22 to October 29; San Francisco Bay (date not recorded).

Berkeley, California, September 14, 1919.